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AUTHOR McWilliam, R. A.; Bailey, Donald B., Jr.
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ABSTRACT

Effects of two environmental variables, activity type and age groupings, and two child variables, age and handicapping condition, were examined with respect to the engagement of toddlers and preschoolers in a mainstreaming day care center. The construct of engagement is predicated on the assumption that the more time an individual spends attending to and interacting with his or her surroundings, the more opportunities he or she has to learn. A total of 48 children were observed on 8 occasions each during either free play or structured activities. Findings indicated that age had little effect on engagement with adults, but was associated with overall engagement. Engagement with materials was associated with age by grouping interaction. Structured activities promoted engagement with adults and free play promoted engagement with peers. Both children with handicaps and normally developing children engaged with peers more in free play than in structured activities. Children with handicaps spent almost three times as much time observing as playing in free play and over twice as much time observing as playing in structured activities. Younger children were more likely to be engaged with materials in same-age groups, and older children more likely to be engaged with materials in mixed-age groups. Results are discussed in terms of implications for future research and recommendations for practice. (30 references) (Author/RH)

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Factors Influencing Child Engagement in Mainstream Settings

R. A. McWilliam and Donald B. Bailey, Jr.

Frank Porter Graham Child Development Center

University of North Carolina

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Abstract

The effects of two environmental variables (activity type and age groupings) and two child variables (age and handicapping condition) were examined with respect to the engagement of toddlers and preschoolers in a mainstreaming day care center. The construct of engagement is predicated on the assumption that the more time an individual spends attending to and "interacting" with his or her surroundings the more opportunities he or she has to learn. Forty-eight children were observed on eight separate occasions each during either free play or structured activities. Age had little effect on engagement with adults, but was associated with engagement overall, and engagement with materials was associated with an age x grouping interaction. Generally, structured activities promoted engagement with adults and free play promoted engagement with peers. Children with handicaps and normally developing children both were engaged with peers more in free play than in structured activities. Children with handicaps spent almost three times as much time observing compared to playing in free play and over twice as much observing compared to playing in structured activities. Younger children were more likely to be engaged with materials in same-age groups, and older children more likely to be engaged with materials in mixed-age groups. The results are discussed in terms of their implications for future research and recommendations for best practice.

Factors Influencing Child Engagement in Mainstream Settings

The time children spend interacting with the environment in a developmentally and contextually appropriate manner is known as engaged time. Generally, it is assumed that large proportions of engaged time are desirable, and the extent to which child care programs promote engagement is considered an indicator of high quality services (McWilliam, Trivette, & Dunst, 1985).

The construct of engagement is predicated on the assumption that the more time an individual spends attending to and "interacting" with his or her surroundings the more opportunities he or she has to learn. Therefore, the amount of time children are engaged may be necessary if not sufficient for developmental change to occur (McWilliam, Dunst, & Trivette, 1985). The earliest studies of how time was spent in schools focused on evaluating teacher effectiveness, using class involvement as the outcome (e.g., French, 1924; Morrison, 1926; Olson, 1931; Symonds, 1926). Carroll's "A Model of School Learning," published in the Teacher's College Record in 1963, was the springboard for renewed emphasis on classroom research related to time variables. His orientation was teaching foreign languages, and his postulation was deceptively simple: people took different amounts of time to achieve a given level of proficiency (Carroll, 1985). Inherent in the model of school learning (MSL), however, was the principle that student time on task was necessary for learning, an assumption that has since been well substantiated (e.g., Karweit, 1985; Rossmiller (1982).

Independently of the classroom research with school-aged children, Todd Risley and his colleagues at the University of Kansas embarked on a series of studies in the late 1960s and early 1970s, probing the variables that accounted for high levels of engagement with young children. They found that incidental teaching (e.g., Hart & Risley, 1975; 1978; 1980), smooth transitions between activities (e.g., Krantz & Risley, 1974), modified open room arrangements (e.g., Twardosz, Cataldo, & Risley, 1974), accessible toys (Montes & Risley, 1975), and carefully sequenced activities (Krantz & Risley, 1977) produced high levels of engagement. The major contribution of these studies was an increased understanding of the environmental variables affecting engagement in settings less structured than classrooms.

The importance of the engagement construct emphasizes the need to determine characteristics of children and their environments that influence the nature and amount of engagement. Although any number of factors may affect engagement levels, four major variables are the focus of this paper, two child variables (age and handicapping condition) and two environmental variables (activity type and age groupings).

Child Age

Engaged time appears to increase with age. Stodolsky (1974) found that younger children (40-58 mo) spent less time in activities and more in transitions, but their activity lengths were less variable than were those of older (67-81 mo) or middle

(59-66 mo) children. Three-year-olds spent about 73 percent of the time engaged in activities, compared to 86 percent for six-year-olds. Older children spent less time in "presolution" (wandering, watching, social encounters, asking for help, etc.). In a study of 20 early childhood programs in western North Carolina, the average age of the children in each program was negatively correlated (-.40) with active engagement with adults (Dunst, McWilliam, & Holbert, 1986). Bailey, McWilliam, and Ware (1990) found that younger (1- and 2-yr-old) children spent more time unoccupied than did older (3- and 4-yr-old) children. Older children spent more time in positive social behavior than did younger children. Thus, as toddlers and preschoolers get older, they spend less time with adults and more time in planned activities and with peers. Their overall nonengaged time seems to decrease with age.

Handicap Status

Todd Risley, who initiated much of the engagement research on people with mental retardation, has proposed that mental retardation be reconceptualized as a deficit in the amount of time individuals spend "interacting with their environments" (personal communication, 1984). The effect of handicap status on engagement has been documented in several studies with young children (e.g., Burstein, 1986; Dunst et al., 1986; Karnes, 1985; Krakow & Kopp, 1983). Krakow and Kopp (1983) found that infants with handicaps of unknown etiology spent less time engaged in a laboratory situation than did normally developing infants or

infants with Down syndrome, and both groups of delayed infants paid less attention and spent more time unoccupied than did the normally developing infants. In center-based programs, Dunst et al. (1986) found a positive correlation between handicap status (higher score=nonretarded) and engagement with peers. Racissi and Baer (1984) found that both handicapped and normally developing preschoolers displayed more off task behavior when the teacher was away from the group than when she was present, but children with handicaps spent more time off task. Both Burstein (1986) and Bailey et al. (1990) confirmed that children with handicaps spend more time unoccupied than do normally developing children. In addition, Burstein found that children with handicaps spent more time (27%) interacting with adults (vs. 13% for normally developing children) and less time (9%) interacting with peers (vs. 29% for normally developing children). Engagement and handicap status appear therefore to be related. The literature suggests overall engagement is affected, as are specific types and forms of engagement (e.g., Burstein, 1986; Karnes, 1985) and contexts for behavior (e.g., Karnes, 1985).

Age Mixture

Traditionally, children are grouped homogeneously by age in classroom programs, but early intervention programs have, either by necessity or by philosophical design, paid increasing attention to mixed-age groupings. Because heterogeneous grouping has produced differential effects in terms of social interactions (Goldman, 1981; Guralnick & Groom, 1987a; Howes & Farver, 1987),

engagement might be functioning as a mediating variable. That is, group mixture might be related to levels of engagement that in turn are related to other outcomes. For example, two-year-olds have been observed to be engaged in more social pretend play with older children than with same-age partners (Howes & Farver, 1987). Guralnick and Groom (1987a) found that, even though preschoolers with handicaps spend more time in solitary play than their developmental-age matches (Guralnick & Groom, 1987a), they did not differ significantly in social play. When in group play, however, the children with handicaps prefered their chronological-age peers (the other four-year-olds), even though the time spent in social play differed between the two groups. Generally, chronologically or developmentally younger children prefer and benefit from interactions with older children. Older children, however, have been found to prefer and interact more with same-age peers, but did not appear to suffer any ill effects from being in mixed-age groupings. The preschool studies have focused on social behavior, so the question remains whether group type has the same effect as it did on school-age children (less time-on-task in mixed-grade combinations, (Veenman, Lem, & Voeten, 1987) or whether the findings of positive effects on social behavior would generalize to other types of engagement.

Activity Type

The fourth variable of interest is activity type (child- vs. adult-directed). High levels of engagement have been associated with child-initiated interactions (e.g., Dunst et al., 1986; Hart

& Risley, 1975, 1978, 1980), and stable patterns of engagement have been found where informal classroom management was practiced (McWilliam et al, 1985). In the latter study, all but the most structured activities produce high levels of engagement in informal programs, whereas the unstructured times produce the highest engagement in formal programs. On the other hand, Johnson, Ershler, and Bell (1980) showed that functional (low-level), unoccupied, and onlooker behavior prevailed in "discovery" programs compared to traditional formal education programs, where constructive play was higher.

Within programs, Carta and Greenwood (1987) found that during the prime morning hours preschoolers spent 21 percent of the time in play, 15 percent in transitions, and 14 percent in preacademics. Large amounts of time in transitions have troubled early childhood educators and were the impetus for much of the early engagement research (e.g., Doke & Risley, 1972; LeLaurin & Risley, 1972; Sainato & Lyon, 1983).

Free play is considered an important feature of early childhood programs, particularly since it has been shown to produce more time spent in active engagement than other activities (Karnes, 1985). How the adults function during "free play" in mainstreamed settings might account for some differences between programs or program types; for example, preschool teachers have been observed giving more information and directives to children with handicaps than to normally developing children (Stipek & Sanborn, 1985). The definition of free play

must therefore be considered when reading about studies that compare types of activity.

Karnes, Johnson, and Beauchamp (1989) studied children (age range = 62-78 mo) following problem-solving instruction in small groups, dyads, or individually that took place outside the regular classroom. "Active engagement" increased in four children, did so marginally in two, and did not in four. The authors concluded that sessions for teaching problem-solving skills result in increased engagement for some children, but clearly the findings raise questions about the transferability of such isolated instruction on in-class engagement. In fact, one-on-one instruction in preacademics, compared to a one-to-three ratio, has been found to have no significant effect on engagement in children with mental retardation (Frankel & Graham, 1976).

Interaction Effects

Although each of the aforementioned variables appears to influence children's engagement, there is strong evidence to suggest significant interaction effects. For example, Bailey et al. (1990) found a handicap status by age by group type effect: younger children with handicaps spent more time unoccupied in mixed-age groups, whereas older children with handicaps spent more time unoccupied in same-age groups. The pattern for normally developing children was reversed (i.e., more unoccupied time for younger children in same-age groups and for older children in mixed-age groups). Likewise, engagement appears to be influenced by the interaction of handicap status and activity

type. In Burstein's (1986) study, children with handicaps spent 57 percent of the time on task in "rug time" (circle-type activities), compared to 76 percent in center time, whereas normally developing children's engagement was similar in both settings (81% and 86%, respectively). Karnes (1985) found no difference between handicapped and normally developing children in verbal engagement nor active engagement in free play, but significant differences in active engagement in organized group settings. The normally developing children spent more time in active engagement than did the children with handicaps. Children with handicaps have been found to exhibit less time in social play, more unoccupied time, and less time in negative styles of play in a mainstream day care center than did their normally developing peers.

Despite the evidence in support of interaction effects, few studies have investigated multiple independent variables in an analysis of engaged time. Thus the present study was undertaken in an effort to clarify the relationships among age, handicap status, age mixture (grouping), and activity type on the amount and distribution of young children's engaged time.

Method

Subjects

Forty-eight children at a university day care center served as subjects. One third (N=16) had a mild or moderate level of developmental delay. They were divided into eight groups, four of which had same-age children and four had mixed ages. The four

same-age groups consisted of one-year-olds, two-year-olds, three-year-olds, or four-year-olds. The mixed-age groups were composed as follows: two groups for one- and three-year-olds, and two groups for two- and four-year-olds. Each group had six children. In the mixed-age groups, three of the children were older and three were younger. In each group, two of the children had handicaps; in the mixed-age groups, one child with handicaps was older and one was younger. The normally developing children were selected from a waiting list, and the children with handicaps were recruited from the community. All children were assigned to groups using a variation of a stratified random assignment procedure to control for socio-economic status (approximately 1/3 of the total sample from low SES, 1/3 from middle SES, 1/3 from high SES), gender (48% female, 52% male), and race (42% minority [predominantly black], 58% white). Thus, all the groups were similar except for age composition.

Setting

The day care center occupied one floor of a university research center and one small adjoining building. The groups were divided by 48-inch-high barriers, and children remained in their groups during the major portion of the day (9:00 a.m. to 3:45 p.m.). At the beginning and end of the day, they were grouped by chronological age. The group spaces were arranged in modified open designs (Crisp & Sturmey, 1984), with areas for table-top activities, floor activities, and quiet time. Toys and

books were stored on child-level shelves, and sinks and toilets were child-sized.

The classroom teachers were all veteran (mean length of employment = 15.3 yr, SD = 3.7 yr) female employees of the day care center. Their average age was 46.5 years (range = 33.4 - 59.4), and the average amount of education was 13.9 years (SD = 1.5). The resource staff, one special education teacher, one speech and language pathologist, and one physical therapist, all had master's degrees. They provided up to one hour's service for each child with handicaps needing the service per week.

The curriculum consisted of play-based activities within a loose schedule. The teachers used the Learningames curriculum (Sparling & Lewis, 1979; 1984) to ensure that every child participated daily in planned, developmentally appropriate activities. Children with handicaps received additional activities as needed from the resource staff, as specified on the individualized family service or educational plan.

Instrumentation

A momentary time sampling data sheet (the Engagement Check) was used to record child engagement, defined broadly as the amount of time children spend interacting appropriately with their environment. The Engagement Check was designed for 40 time samples over a 10-minute period. For the focal child, three types of engagement could be scored and, within each type, two forms of engagement could be scored (see Table 1). Thus the observers had six potential codes for an engaged child, but only

one or two codes were entered per time sample. A child could be engaged with combinations of types of engagement (e.g., with adults and with materials simultaneously), but the two forms of engagement within each type were mutually exclusive (e.g., noninteractive and interactive engagement could not be coded simultaneously). If the child was nonengaged, two forms were possible: active or passive. A separate code for transitions was used when a child was in motion and the observer could not determine at that instant whether the moving behavior was goal-directed or inappropriate. Brief definitions for each of the eight codes are given in Table 1, and more extensive operational definitions are available from the authors.

Insert Table 1 about here

At each time sample, the observers also recorded group engagement, by simply counting the number of children present and the number engaged (Cataldo & Risley, 1974). The proportion of children engaged at each time sample was computed later.

Procedures

Two trained observers (graduate students) stood where they could observe the children in each "classromm" over a four-foot, six-inch barrier and where the whole classroom could be seen. Each observer used a stopwatch or watch with a second hand to make momentary time sample observations every 15 seconds for a total of 10 minutes per observation. Observation sessions

occurred between 9:00 and 11:00 a.m.; no child was observed in the same type of activity (free play, structured) twice on the same day. Free play was operationally defined as time when the child could choose with what and whom to play. A structured activity was defined as time when the child (a) was expected to participate in a planned activity led by the teacher or (b) received one-on-one attention from the caregiver. Some sessions included some free play and some structured activity (e.g., when the caregiver gave one-on-one attention during a scheduled free play activity); the activity was coded by the activity type that lasted longer (i.e., over 20 intervals). Eighty-eight percent of the sessions consisted of only one type of activity (i.e., either free play or structured).

The teachers were not informed who the focal child was. Each child was observed four separate times during free play and four separate times during a structured activity over ten weeks. For reliability checks, both observers stood together, using the same stopwatch or watch, but recording their codes independently.

The coding procedure involved watching the focal child for 15 seconds, taking a mental snapshot at the coding time (i.e., at 15 sec, 30 sec, 45 sec, and on the minute), making the two group counts, and checking the appropriate spaces on the code sheet. The mental snapshot took two seconds, the group counts approximately three seconds, decision-making about the focal child (coding latency) about two seconds, and writing three seconds, leaving five seconds before the next time sample. Note,

however, that the recorded engagement for the focal child was the behavior seen only during the two-second moment.

Results

Selected aspects of engagement were found to vary as a function of activity type, handicap status, child age, and grouping type. The data were first analyzed by a repeated measures analysis of variance (ANOVA), with activity type as the within-subject factor, followed by ANOVA between subjects, aggregating the data across activity types. A slightly conservative alpha of $p=.01$ was used because of the relatively large number of multivariate tests and the small sample size. The results, as described next, confirmed our hypothesis that activity type plays an important role in accounting for engagement levels. Generally, structured activities promoted engagement with adults and free play promoted engagement with peers. In engagement with materials, the context played differential roles depending on the handicap status. Nonengagement varied as a function of activity type also, but in interaction with handicap status and in interaction with the focal child's age.

Composite Types of Engagement (Aggregated Across Levels)

Univariate tests for within-subject effects revealed, as would be expected, that children spent more time engaged with adults in structured activities, $F(1,41) = 91.25$, $p < .001$, and more time engaged with peers in free play. $F(1,41) = 20.97$, $p < .001$ (see Table 2). Normally developing children spent

significantly more time with peers during free play than did children with handicaps (see Table 3). Engagement with materials was not affected by activity type. Younger children, regardless of handicap status, showed more nonengagement in free play (Table 2), whereas older children in free play exhibited the least nonengagement, $F(1,41) = 11.68$, $p < .01$.

Insert Tables 2 and 3 about here

When the activity types were aggregated, the following between-subject findings emerged. Overall engagement was affected by handicap status (Table 4), with handicapped children spending more time nonengaged than did normally developing children, $F(1,41)=18.34$, $p<.001$. Engagement with adults was strongly affected by a handicap status x grouping interaction, where handicapped children in same-age groups (13.4%) were less engaged with adults than were handicapped children in mixed-age groups (23.8%), normally developing children in same-age groups (23.8%), and normally developing children in mixed-age groups (21.1%), $F(1,41)=12.96$, $p<.001$. Normally developing children showed higher levels of engagement with peers than did handicapped children, $F(1,41)=11.86$, $p<.01$ (Table 4). Older children in same-age groupings spent the least time engaged with materials, with older children in mixed-age groupings most highly engaged with materials, $F(1,41)=12.29$, $p<.01$. Thus, all types of engagement, especially social (adults, peers) engagement, are

affected by the child's handicap status. Chronologically homogeneous peers did not affect the overall amount of engaged time or time spent with adults, but they did influence how engagement was distributed with peers and with materials.

Insert Table 4 about here

The above results represent the composite types of engagement only (adult, peer, materials, nonengagement), which were computed by aggregating the two forms (levels) of engagement described in the Method section. Social engagement (adults, peers) was coded as either interactive or noninteractive, nonsocial engagement (materials) as either mastery or premastery, and nonengagement as either passive or active. At this more precise level, the data provide added qualitative information about the effects of activity type, handicap status, age, and grouping.

Engagement with Adults

Structured activities produced more of both interactive, $F(1,41)=14.40$, $p<.001$, and noninteractive, $F(1,41)=54.87$, $p<.001$, engagement with adults compared to free play (Table 2). An interaction effect of handicap status x grouping on engagement with adults is explained by time spent in noninteractive engagement with adults. Handicapped children in mixed-age groups spent the most time watching and playing beside adults (15.2%), followed by normally developing children in same-age groups

(13.8%), $F(1,41)=7.68$, $p<.01$. Normally developing children were more engaged in interactive engagement with adults than were handicapped children, $F(1,41)=13.40$, $p<.001$ (Table 4).

Engagement with Peers

Activity type produced significant differences in both interactive and noninteractive engagement with peers. Table 3 shows that normally developing children played with peers (interactive engagement) more in free play than they did in structured activities and for longer than handicapped children did in either type of activity, $F(1,41)=15.4$, $p<.001$. Table 2 shows that older children displayed the highest levels of interactive peer engagement in free play, followed by older children in structured activities, whereas younger children played with peers more in structured activities than in free play, $F(1,41)=10.75$, $p<.01$. Watching peers (noninteractive engagement) was not associated with any of the independent variables. Across activity types (see Table 4), normally developing children played with other children much more than handicapped children did, $F(1,41)=26.04$, $p<.001$.

Engagement with Materials

An age x grouping effect for engagement with materials was found only when levels of this type of engagement (i.e., premastery and mastery) were aggregated as described earlier.

Nonengagement

Nonengagement data provide the information about overall engagement, since it was mutually exclusive from the engagement

categories. Handicapped children, $F(1,41)=18.34$, $p<.001$ (Table 4) were more nonengaged than were normally developing children. When both active and passive nonengagement were aggregated, younger children were found to be marginally more nonengaged in free play (Table 2); in contrast, older children showed the least down-time in free play, $F(1,41)=11.68$, $p<.01$. Structured activities produced comparable amounts of nonengagement in younger and older children. A similar pattern was seen when only the passive nonengagement data were analyzed, with older children in free play showing considerably less down-time than those in structured activities and less than younger children in either activity type, $F(1,41)=8.33$, $p<.01$.

Discussion

This study shows that engagement reflects the developmental competence of toddlers and preschoolers and the quality of some aspects of the child care environment. Handicap status, activity structure child age, and group age mixture are discussed with regard to their effects on types and levels of engagement.

Child Age

The findings that child age and handicap status (to an even greater extent) are associated with engagement, suggest that engagement is associated with developmental level. The amount of structure in the activity, however, mediates the effects of age, with three- and four-year-olds spending more time engaged during free play than they do in structured activities. The finding that age had little effect on engagement with adults was somewhat

surprising; we had anticipated that younger children would be more drawn to adults (or vice versa) than would older children. It is possible that the small groups (6 children) created similar opportunities for this type of engagement for both older and younger children. The pattern supports both the idea of engagement as a corollary to development (chronological age) and the differential effects of activity structure in peer-peer interactions. That is, older children in free play spent the greatest proportion of time **interacting** with peers. Younger children, however, spend slightly more time interacting with peers during structured activities than during free play. These engagement measures appear to be sensitive to the relationship between child age and levels of engagement (older children more interactive, younger children more noninteractive). Engagement with materials was associated with an age x grouping interaction (higher for older children in mixed-age groups than in same-age groups). One possible explanation is that there is less competition for objects in mixed-age groups, since older and younger children would play with different materials. The higher engagement with materials in same-age groups, compared to mixed-age groups, for younger children may have occurred because, in classrooms for one- or two-year-olds, the materials are selected for developmental appropriateness. There may simply have been enough reinforcing materials for those children. In mixed-age groups, however, where a greater variety of toys were provided,

the younger children had less opportunity for engagement with materials.

Handicap Status

Not surprisingly, given the pervasive effects of chronological age (CA), handicap status also produced differential engagement outcomes. In addition to the expected higher overall engagement in normally developing children, these children also spent more time interacting with peers. For children with handicaps, the composition of the classroom group has a differential impact on engagement with adults; those in mixed-age groups spend more time with adults than do those in same-age groups. This suggests that adults in mixed-age groups make themselves more available to these children. When the adult is accustomed to interacting with children of different developmental levels (e.g., mixed-age normally developing children), he or she might be more attuned to the needs of children with developmental disabilities.

The amount of structure of an activity is particularly important in interaction with handicap status, since it has been proposed that children with handicaps perform better when given maximal structure (e.g., Bailey & Wolery, 1984). Children with handicaps and normally developing children both were engaged with peers more in free play than in structured activities (Table 3). It is instructive, however, to inspect the **interactive** engagement data closely and note that only normally developing children in free play were thus engaged. Children with handicaps played with

peers for about the same amount of time, regardless of activity type. The inhibitory effect of structured activities on interactions with peers is demonstrated by considerably lower scores for normally developing children in structured activities. Clearly, normally developing children thrived in playing with peers in free play, whereas children with handicaps did not. Nevertheless, interactive engagement with peers was higher in free play than in structured activities for both groups.

Contrary to expectations, both normally developing children and those with handicaps spent about the same amount of time observing other children. Children with handicaps spent almost three times as much time observing compared to playing in free play and over twice as much observing compared to playing in structured activities. These data support the conclusions other have made (e.g., Guralnick, 1988; Strain & Kohler, 1988) that children with handicaps need support for peer interactions. The structured activities observed in these settings presumably did not foster peer interactions.

Same-Age vs. Mixed-Age Grouping

It seems that decisions about mixed- or same-age grouping should be made with considerations as to (a) the age of the children and (b) the desired outcomes. Our data indicate that, if spending time with materials is important, younger children are more likely to be engaged in same-age groups, and older children more likely to be engaged in mixed-age groups. Although no differences were found for mastery or premastery, these

findings are somewhat consistent with Blasco and Bailey (1990), who found higher levels of mastery in mixed-age groups of toddlers, compared to same-age groups. We had expected to find differences in social behavior between the two types of grouping, but here again we agree with an earlier study (Bailey et al., 1990), that any differences were more subtle than we could detect through these measures.

Activity Type

Unlike the other three variables, which were analyzed with the between-groups sums of squares, this variable, activity type, was analyzed with within-group sums of squares, since each child was observed four times in free play and four times in structured activities. The degree of structure affected overall engagement and both types of social engagement, but not engagement with materials. Generally, free play is related to greater proportions of engagement, except for engagement with adults, where greater proportions were seen in structured activities. Comparatively high proportions of this type of engagement during structured activities were expected, since, by definition, an adult had to be directing the activity or interacting one-on-one with the focal child. The proportion of time spent in interactive versus noninteractive engagement with adults in structured activities, reveals that considerably more time was spent listening to and watching the adult than interacting with her. This suggests that structured activities successfully

attract children's attention and, to a lesser degree, increase children's interaction time with adults.

The pervasive main effects and interaction effects associated with activity type confirm the strong influence of context on this measure. Put another way, the influence of context is detected by this functional measure of children's social behavior.

The findings of this study should be interpreted in light of the following caveats. First, the caregivers at the child care center were primarily noncertified day care providers, so our data regarding differences between structured activities and free play might only be generalizable to similar mainstream day care settings. Second, the groups were very small, which diminished the children's choices of peers to observe or with whom to interact. Third, because the same-age groups included two children with developmental delays, the developmental ages were somewhat heterogeneous. Fourth, interobserver reliability for the two levels of engagement with materials (i.e., distinguishing between premastery and mastery) was not as high as we would have liked.

At present, we must still infer the significance of the construct of child engagement from classroom research with school-aged children, where on-task behavior is more rigorously defined than is appropriate with infants, toddlers, and preschoolers. The rationale for this deductive process is that time off-task in schools is comparable to unoccupied time in

early intervention classrooms. Karweit (1985) has reported that time variables accounted for about 10 percent of the variance in school achievement, and Rossmiller (1982) has found that 70 percent of the variance in reading achievement could be attributed to time-on-task variables. We thus concur with an earlier study (McWilliam et al., 1985) that engaged time holds promise for a suitable measure of classroom-based effectiveness.

Engaged time is clearly only one predictor of child outcomes. Scriven (1985) has proposed that educational achievement at a given time varies as a function of motivation, time types (scheduled time, logged time, engaged time), relevance of what is being learned, importance of the curriculum, developmental appropriateness of the materials and content, and presentation. He notes that, "Engaged time is not yet operationally defined, by a long way. ... [It] is simply a theoretical construct for which we have a few good indicators, especially negative ones (the "off-task" indicators)" (p. 325). Berliner and Fisher (1985) have concluded that research on engagement (a) has qualified or debunked assumptions about the educational process, (b) can be used to improve schools, (c) can suggest changes in classroom organizational patterns, (d) can have implications for teacher evaluation, and (e) has implications for educational research in general.

Work remains to be done on the importance of how children spend their time in early intervention. The effects of child and environmental characteristics on engagement described here

suggest future directions for research and recommendations for best practice. First, the relationship between engagement and developmental gain needs to be determined as well as the direction of that relationship. Second, the methodology for observing how children spend their time (length of observation required, better interobserver agreement) needs improvement. Third, we need more qualitative information about the four types of engagement (with adults, with peers, with materials, nonengaged), beyond the two levels used in this study.

Naturalistic studies of child behavior in classroom-based settings lend themselves to recommendations for application. The following strategies should improve child care and early intervention services:

1. Provide necessary supports for peer-peer interactions involving children with handicaps.
2. Look for or create opportunities for children with handicaps to interact with adults. Children with handicaps need to spend more than six percent of the time interacting with adults. Although not statistically significant, the difference between their engagement with adults and that of normally developing children is most obvious in structured activities. Caregivers interacting with children during structured activities need to be especially conscientious about interacting with children with handicaps in mainstream settings.

3. In organized activities, provide much free choice and little adult directiveness, perhaps using milieu teaching (encouraging elaboration of child-initiated behaviors) during free play, especially to toddlers.
4. Provide three- and four-year-olds with opportunities for mixed-age peer groupings for enhancing play with toys.

This study demonstrates a step forward in the use of engagement measures for assessing the differential effects of child and classroom features. In 1984, Bailey and Wolery speculated that ratings of children's engagement might not provide information about the quality of behavior, thus calling into question the utility of engagement as a measure of the effectiveness of informal versus formal activities (e.g., Doke, 1985) . The present study includes important advances in the development of this measure. First, engagement is clearly defined as developmentally and contextually appropriate behavior. Second, engagement is measured through observation of individual behavior rather than as a proportion of the group participating. Third, engagement was categorized by type and level, providing more information about what was going on during engaged time. Further research is needed to refine this construct and to elaborate upon this measurement system.

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Table 1. Operational Definitions for Types and Forms of Engagement/Nonengagement

TYPE	FORM	DEFINITION	EXAMPLES
Engaged with Adults/Peers	Interactive	The child's focus is on another person. Behavior is aimed at producing a social effect.	*Interdependent play* *Mutual Organization* *Gestures* *Talking*
Engaged with Adults/Peers	Noninteractive	The child is attending to another person or playing nearby with similar materials (parallel play).	*Looking* *Orienting* *Tracking* *Listening*
Engaged with Materials	Premastery	The child's behavior is visually or physically exploratory, but not goal-directed.	*Repetitive (practicing) behaviors* *Looking at objects* *Simple manipulation* *Nondirected play*
Engaged with Materials	Mastery	The child interacts with the environment in a goal-directed manner when such behavior is developmentally and contextually appropriate.	*Problem solving* *Play behavior used to produce an effect* *Functional play with toys* *Pretend play*
Nonengaged	Active	The child interacts with adults, peers, materials or self in a manner that is inappropriate for the child's developmental level and for the context of the activity.	*Crying* *Acting out* *Stereotypic behavior* *Fighting* *Breaking rules*
Nonengaged	Passive	The child is not interacting or is minimally interacting with the environment.	*Waiting* *Staring (unfocused)* *Wandering (aimlessly)*

Table 2
Percentage of Time Engaged by Activity Type and Age

Engagement Type	Free Play			Structured		
	Overall	Younger	Older	Overall	Younger	Older
Adults	**13.15**	**13.73**	**12.52**	**29.74**[a]	**29.41**	**30.08**
Interactive	7.08	7.24	6.91	10.78**	10.53	11.03
Noninteractive	6.07	6.49	5.61	18.96**	18.88	19.05
Peers	**29.79**	**17.53**	**26.26**	**17.82****	**22.65**	**31.40**
Interactive	14.47	5.86	20.13	5.49**	9.25	17.40*[b]
Noninteractive	15.32	11.67	6.13	12.33*	13.40	14.00
Materials	**53.86**	**54.35**	**53.34**	**53.32**	**53.30**	**52.16**
Mastery	27.94	26.09	29.95	25.52	27.21	23.73
Premastery	25.92	28.26	23.39	27.80	26.09	28.43
Nonengaged	**14.56**	**18.87**	**9.86**	**16.87**	**16.83**	**16.81****
Active	1.95	2.10	1.79	1.48	0.83	2.17
Passive	12.61	16.77	8.07	15.34	16.00	14.64**

*$p < .01$
**$p < .001$
[a]Asterisks in this column represent significant Free Play vs Structured findings
[b]Asterisks in this column represent significant Activity Type x Age interactions

Table 3
Percentage of Time Engaged by Activity Type and Handicap Status

Engagement Type	Free Play		Structured	
	ND	H	ND	H
Adults	**14**	**12**	**32**	**25[b]**
Interactive	8	5*b	13	7*
Noninteractive	6	7	19	18
Peers[a]	**35**	**20****	**20**	**15**
Interactive**	19	5**	6	4*
Noninteractive	16	14	13	10
Materials	**53**	**56**	**57**	**46**
Mastery	28	28	29	20
Premastery	25	28	28	27
Nonengaged	**11**	**20**	**12**	**27****
Active	2	2	1	3
Passive	10	19*	11	24**

*$p < .01$
**$p < .001$

[a]Handicap Status x Activity Type interaction effects in this column
[b]Main effects for Handicap Status within Activity Type in these columns
Owing to rounding, subcategories do not necessarily add to category scores

Table 4
Percentage of Time Engaged by Developmental Status and Grouping by Age

Engagement Type	Normally Developing	Handicapped	All Childern			
			Same-Age		Mixed-Age	
			Younger	Older	Younger	Older
Adults	**12.76**	**18.55[a]**	**21.38**	**19.68**	**21.55**	**22.99**
Interactive	10.37	5.97**	8.18	7.67	9.64	10.38
Noninteractive	12.39	12.58	13.20	12.01	11.91	12.61
Peers	**27.29**	**16.96***	**17.53**	**33.43**	**21.08**	**23.82**
Interactive	12.65	4.74**	5.86	15.15	8.50	11.00
Noninteractive	14.64	12.22	11.67	18.33	12.58	12.82
Materials	**54.80**	**51.18**	**56.09**	**45.22**	**52.45**	**61.02***
Mastery	28.29	23.64	27.50	22.53	25.66	31.61
Premastery	26.51	27.54	28.59	22.69	26.79	29.41
Nonengaged	**11.82**	**23.43****	**18.87**	**15.15**	**16.71**	**11.35**
Active	1.48	2.18	1.98	2.75	0.89	1.13
Passive	10.34	21.25**	16.89	12.40	15.82	10.22

*$p < .01$
**$p < .001$
[a]Asterisks in this column represent significant Handicapped vs. Normally Developing findings
[b]Asterisks in this column represent significant 2-way interaction effects (Grouping x Age)